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| **Mathematics Lesson Plan** | | | | |
| **Grade Level**  **Third** | | Concept | **Teacher** | **Date(s)** |
| **Outcomes** | | | | |
| **Content**  *Common Core Standards &Essential Standards* | 3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table),and explain them using properties of operations. For example, observe that 4 times a numberis always even, and explain why 4 times a number can be decomposed into two equal **addends** | | | |
| **Big Idea**  *What is the key learning? Why are you doing this?* | Continue and extend addition patterns.Identify and describe whole-number patternsand solve problems. | | | |
| **Essential Question(s)**  *What question(s) should students be able to answer at the end of the lesson/unit?* | How can you use properties to explain  patterns on the addition table? | | | |
| **Knowledge**  *What do students need to know to be successful (e.g., formulas, vocabulary, etc.)?* | 2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members,  e.g., by pairing objects or counting them by 2s; write an equation to express an even number  as a sum of two equal addends.  2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5  rows and up to 5 columns; write an equation to express the total as a sum of equal addends.  2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.  **Vocabulary**  **Even**  **Odd**  **Pattern**  **Addend**  **Repeat**  **Occur**  **Sequence**  **Most likey**  **Extend**  **Addition**  **increase** | | | |
| **I Can Statements**  *What should students be able to do independently?* |  | | | |
| **Evidence of Learning** | | | | |
| **Assessment**  *A good activity should reflect mastery of the standards and be completed independently.* |  | | | |
| **Resources** | | | | |
| **Technology & Resources**  *List the technology and resources being used in the lesson (e.g., text, web sites, video, etc.)* | <http://www.livebinders.com/play/play?id=475588>  <http://www.math-aids.com/Addition/Addition_Doubles.html> | | | |
| **Materials**  *List all materials being used in the lesson* | Student: Crayons or markers, hundreds chart <http://superteacherworksheets.com/hundredschart/hundreds-chart-filled_WNRTB.pdf>  Doubles Worksheet  <http://www.math-aids.com/Addition/Addition_Doubles.html> | | | |
| **Instructional Plan** | | | | |
| **Number Talk**  *During a number talk, the teacher presents an equation for students to solve mentally or a quick image for students to determine the*  *number of objects. Students compute mentally using a variety of strategies in a short amount of time (to promote fluency). The teacher facilitates discussion by having various students share strategies (teacher may record strategies or students may present/record their own strategies) and asks clarifying question. The teacher facilitates discussion regarding efficiency of strategies presented.*  **Or**  **Math Task**  *A task is a word problem strategically posed to challenge students’ thinking about a concept or skill. Tasks should be used to expose students to unfamiliar, yet appropriate concepts before formal instruction in a meaningful context. Tasks should also be used to revisit concepts during and after formal instruction in order to deepen students’ understanding of that particular concept. Students work independently or in small groups, using paper and pencil to solve, sharing strategies in a discussion facilitated by the teacher.* | ***Number Talk:***  ***Math Task: http://www.cpalms.org/Public/PreviewStandard/Preview/5363#/#icts-toggle*** | | | |
| **Engage (Whole Group)**   * *Rigorous problem/task that requires reasoning with focus concept(s) for the day* * *Pose a question or conjecture* * *Provide a meaningful context/connection* * *Direct instruction* | **PROCEDURES**   1. Introduce key vocabulary: *multiple, factor, product, double*. 2. Display the [Teacher’s Chart](https://www.teachervision.com/multiplication/activity/3097.html) an overhead transparency, or copy it onto the board. Hand out copies of the [Hundred Chart](https://www.teachervision.com/numbers/lesson-plan/3035.html). 3. Have students count by 2s, shading *multiples*of 2 yellow on their hundred chart. Ask them to examine the numbers carefully. Ask:  * *What patterns do they notice?* (The *multiples* of 2 are even and always end in 0, 2, 4, 6 or 8.)  1. Have students count by 5s, circling the *multiples* of 5 with a blue marker on their number charts. Ask:  * *What patterns do they notice?* (The *multiples* of 5 end in 5 or 0).  1. Model your thinking:  * *When I look at the multiples of both 2 and 5, I see that they all end in zero. It’s like counting by 10s. I notice that 2 x 5 is 10.*  1. Have the students count by 9s on the number chart. Write out the multiplication sentences and answers on the chalkboard (9 x 1 = 9, 9 x 2 = 18, and so on) and ask students to find a pattern and discuss what they find.  * (The sum of the *product’s* digits is 9. The tens digit is 1 less than the other *factor*. Make it clear that they will have to memorize the 9s, but that these patterns may help them remember and can be used to verify the *products*.)  1. Have students look at their charts and find:  * the *multiples* that 2 and 9 have in common (18, 36, 54, 72, 90, and so on). * the *multiples* that 2 and 5 have in common (10, 20, 30, 40, 50, and so on). * the *multiples* that 5 and 9 have in common (45, 90).  1. Ask students what would happen if they shaded in all the multiples of 1 on their charts. (They should soon realize that they’d be shading in everything.) Articulate the *property of one*:  * *The product of a number and 1 is that same number*. * *Every number is a multiple of 1 and itself.*  1. To illustrate, ask several easy questions to the class at large. *What is* 8 x 1? *What is* 9 x 1? Get increasingly harder: *What is* 52 x 1? *What is* 1 million x 1?) 2. Ask students to think about multiplying with zero in terms of repeated addition. *What is* 0 + 0? *What is* 3 x 0? *What is* 52 x 0? *What is* 1 million x 0? Help students to determine the zero property for multiplication:  * *the product of a number and 0 is 0*.  1. Ask students to name the double of 2 (2 x 2 = 4). Share the following problem:  * For his family reunion Ariel wants to make 2 lemon pies that use 5 lemons each. How many lemons should he buy? (2 x 5 =10). Then he remembers that his Uncle Bob loves lemons and is likely to eat 2 pies all by himself. Ariel better make 4 pies! How many lemons will he need to make 4 pies that require 5 lemons each?  1. Explain to students that they can arrive at the answer through the idea of the *double*. Example:   2 x 5 = 10  4 x 5 = 10 + 10  4 x 5 = 20   * *Because 4 is the double of 2, the product of any number multiplied by 4 will be double the product of that same number multiplied by 2.*  1. Ask the students to name other doubles with which this technique might work, such as  * 4 x 2 = 8 and 4 x 6 = 24.   4 x 6 = 24  8 x 6 = 24 + 24   * 4 x 2 = 8 and 4 x 7 = 28.   4 x 7 = 28  8 x 7 = 28 + 28   * 4 x 2 = 8 and 4 x 8 = 32   4 x 8 = 32  8 x 8 = 32 + 32 | | | |
| **Explore** **(guided)**   * *Students work through a set of problems or a task focused on skill or concept of the lesson* * *Teacher facilitates small group discussion, holds individual student conferences, asks probing questions to deepen understanding, identifies student strategies that should be shared with the whole group, and makes decisions about next steps for instruction* | 1. Hand out the [Doubles Worksheet](https://www.teachervision.com/multiplication/printable/3092.html)that develops the concept of the double and complete it with your students until the pattern is clear. [*Answer Key*](https://www.teachervision.com/multiplication/activity/3101.html) | | | |
| **Explain** **(whole group)**   * *Teacher facilitates whole class discussion based on guided practice work* * *Students are exposed to various strategies including student-invented algorithms and teacher-introduced strategies (when appropriate)* | Review answers and facilitate to gauge students reasoning and address misconceptions. | | | |
| **Elaborate** **(independent/small group/whole group)**   * *May be class work or homework* * *Assignment should be revisited to provide student feedback on accuracy of solutions during the class period if class work or the following day if homework* * *Students work independently or in small groups on differentiated sets of problems or tasks to further explore the concept* * *Teacher works with individual students or small groups on intervention strategies or enrichment/extension tasks* | 1. Hand out one or more of the [Independent Practice Worksheet](https://www.teachervision.com/multiplication/activity/3093.html) for students to practice finding the answers or <http://www.mrmaffesoli.com/Printables/3OA9/3OA9-HM.pdf>   **EXTENSION ACTIVITIES**   * Have students complete the [Multiplication Table](https://www.teachervision.com/multiplication/activity/3096.html)through 9 x 9. For extra credit, challenge them to complete the table through 12 x 12. Remind them to use what they have learned about patterns and properties to help. [*Answer Key*](https://www.teachervision.com/multiplication/activity/3095.html) * Hand out the[Extension Worksheet](https://www.teachervision.com/multiplication/activity/3099.html) . You may wish to go over the answers as part of a class discussion. [*Answer Key*](https://www.teachervision.com/multiplication/activity/3104.html) * Hand out the [Enrichment Worksheet](https://www.teachervision.com/algebra/activity/3100.html)and have students solve for *n*. [*Answer Key*](https://www.teachervision.com/multiplication/activity/3105.html)   Visit these sites for more Web resources:  Multiplication games from A+ Math [http://aplusmath.com/Games/index.html](http://leaving.fen.com/offsite.html?http://aplusmath.com/Games/index.html)  Math in literature. Lists books with multiplication themes [http://archon.educ.kent.edu/Oasis/Resc/Educ/mathkidslit.html](http://leaving.fen.com/offsite.html?http://archon.educ.kent.edu/Oasis/Resc/Educ/mathkidslit.html)  Multiplication flashcards [http://aplusmath.com/Flashcards/multiplication.html](http://leaving.fen.com/offsite.html?http://aplusmath.com/Flashcards/multiplication.html) | | | |
| **Evaluate (assessment)**   * *Minute-by-minute assessment throughout the lesson* * *Exit tickets* * *Conferring with students* * *Analysis of students’ notebook* * *Common formative assessments (PLC created)* * *Quizzes* * *Tasks (PLC created, evaluated with a rubric)* * *Student interviews* | <https://www.teachervision.com/multiplication/printable/3092.html>  **ASSESSMENT**   * Have each student answer the [Assessment Questions](https://www.teachervision.com/multiplication/activity/3098.html). * Review multiplication facts daily, using patterns and properties for recalling those facts that are not yet automatic. * Students should be able to: * recognize patterns in multiplication for products involving one-digit factors. * understand and use the *zero property for multiplication* and the *property of one* as a factor in multiplication. * understand and use the technique of the double to solve for more difficult products. * know multiplication facts by using the patterns of factors 2, 5, and 9. * Checking for automaticity should be ongoing and can be as simple as calling out facts for individuals to give products as quickly as they can. This can be done while standing in the cafeteria line or during other windows that occur in a typical school day. A variety of games can be used as tools to assess students and promote memorization. | | | |

5E descriptors from Durham Public Schools Elementary Mathematics Blueprint

**Engagement**